FIG. 1

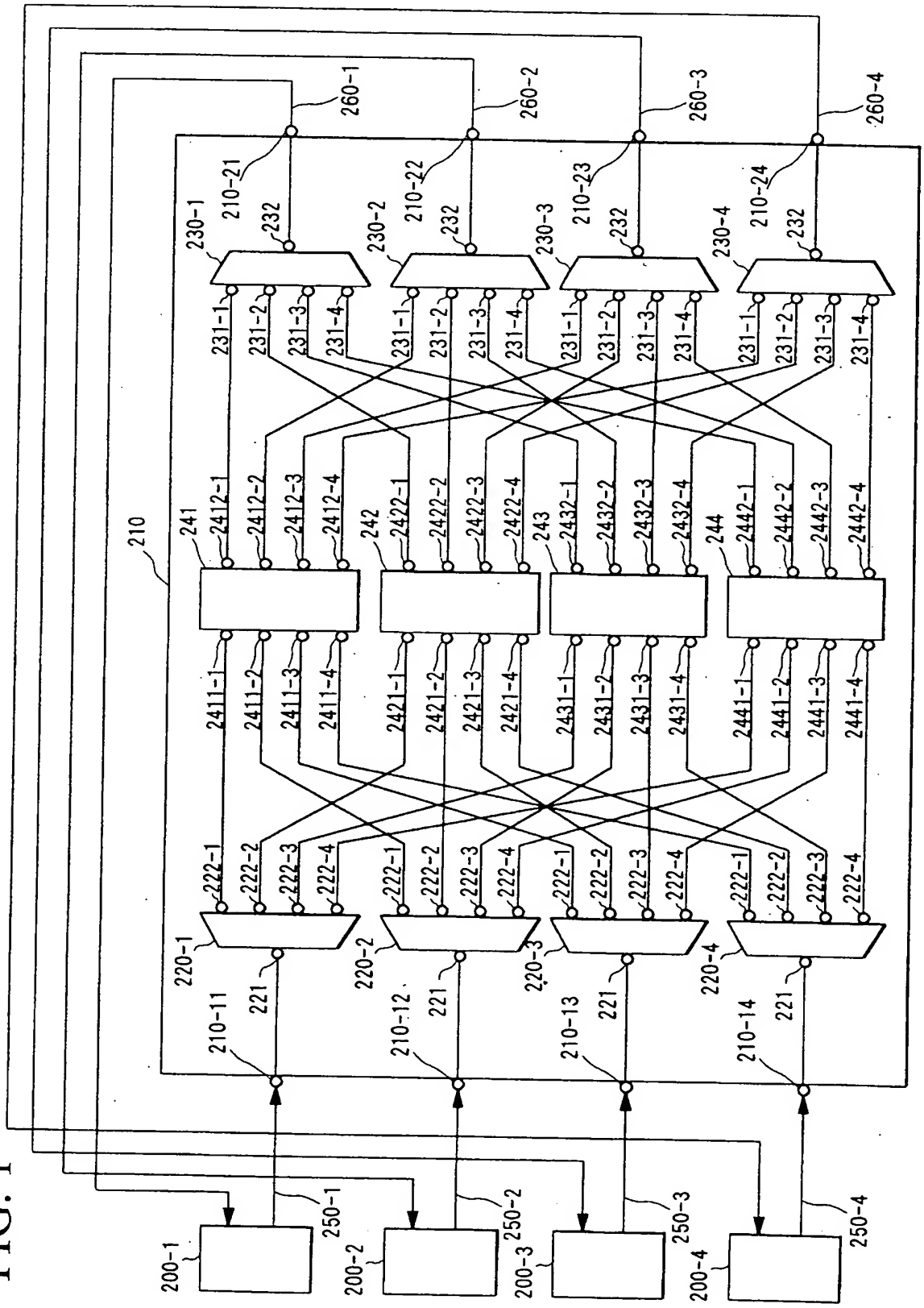

260-1
260-2
260-3
260-4
210-21
210-22
210-23
210-24
230-1
230-2
230-3
230-4
232
231-1
231-2
231-3
231-4
210
241
242
243
244
2412-1
2412-2
2412-3
2412-4
2422-1
2422-2
2422-3
2422-4
2432-1
2432-2
2432-3
2432-4
2442-1
2442-2
2442-3
2442-4
2411-1
2411-2
2411-3
2411-4
2421-1
2421-2
2421-3
2421-4
2431-1
2431-2
2431-3
2431-4
2441-1
2441-2
2441-3
2441-4
222-1
222-2
222-3
222-4
220-1
220-2
220-3
220-4
221
210-11
210-12
210-13
210-14
250-1
250-2
250-3
250-4
200-1
200-2
200-3
200-4

FIG. 2

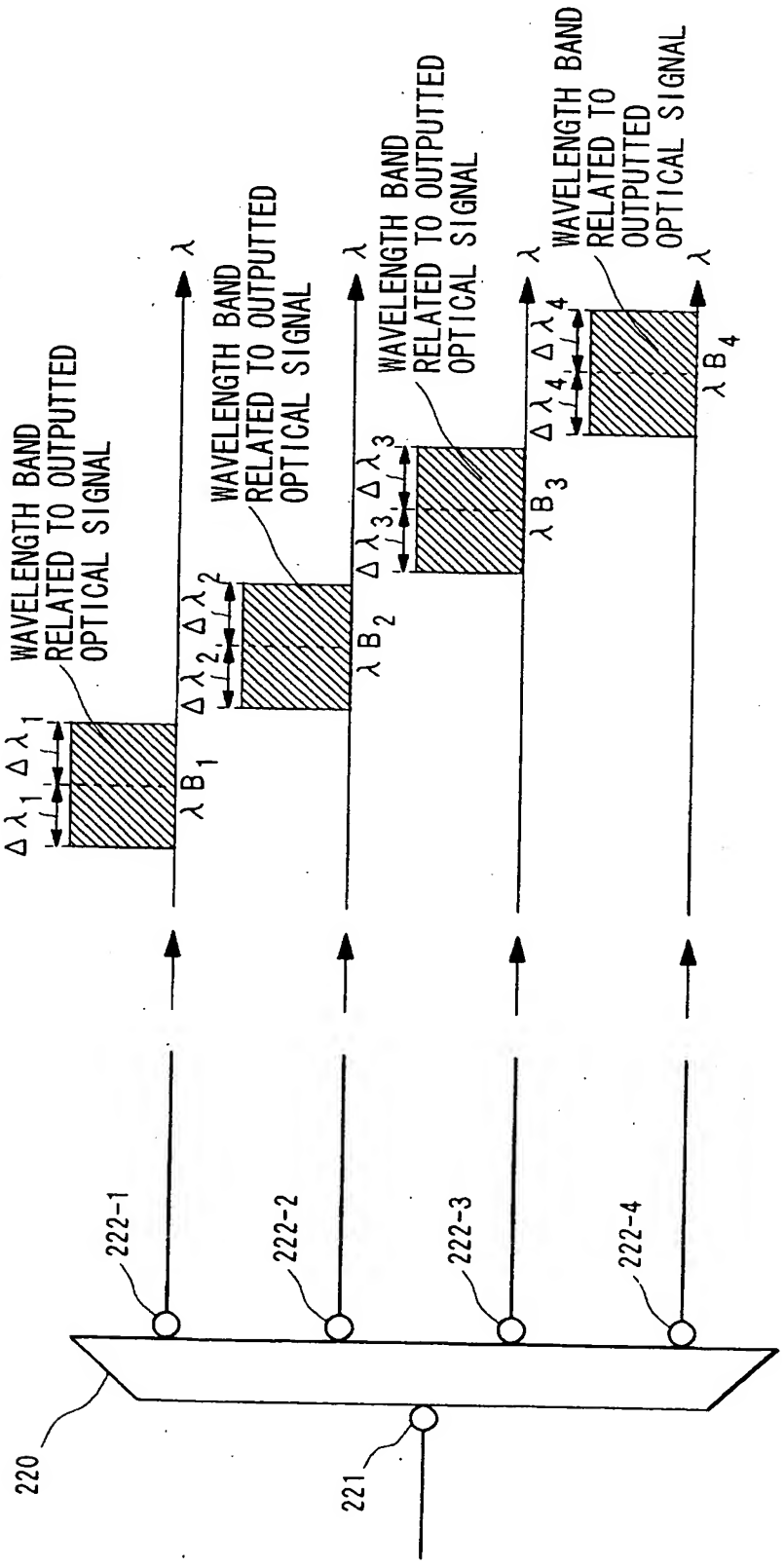

WAVELENGTH BAND RELATED TO OUTPUTTED OPTICAL SIGNAL
WAVELENGTH BAND RELATED TO OUTPUTTED OPTICAL SIGNAL
WAVELENGTH BAND RELATED TO OUTPUTTED OPTICAL SIGNAL
WAVELENGTH BAND RELATED TO OUTPUTTED OPTICAL SIGNAL
λ
λ
λ
λ
Δλ1
Δλ2
Δλ3
Δλ4
λB1
λB2
λB3
λB4
222-1
222-2
222-3
222-4
220
221

FIG. 3

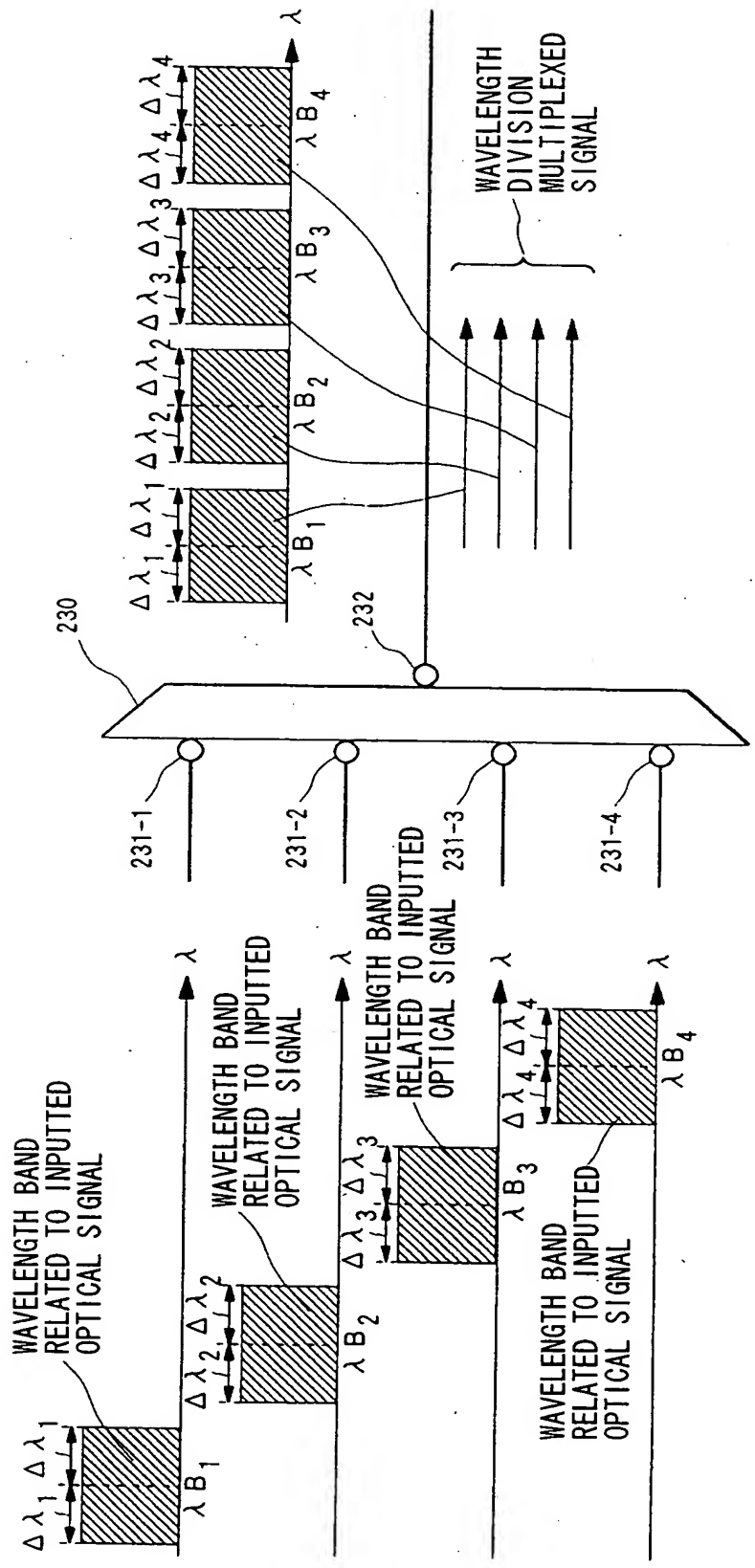

λ
Δλ4 Δλ4
λB4
Δλ3 Δλ3
λB3
Δλ2 Δλ2
λB2
Δλ1 Δλ1
λB1
WAVELENGTH DIVISION MULTIPLEXED SIGNAL
230
232
231-1
231-2
231-3
231-4
WAVELENGTH BAND RELATED TO INPUTTED OPTICAL SIGNAL
WAVELENGTH BAND RELATED TO INPUTTED OPTICAL SIGNAL
WAVELENGTH BAND RELATED TO INPUTTED OPTICAL SIGNAL
WAVELENGTH BAND RELATED TO INPUTTED OPTICAL SIGNAL

FIG. 4

	FIRST OUTPUT PORT	SECOND OUTPUT PORT	THIRD OUTPUT PORT	FOURTH OUTPUT PORT
FIRST INPUT PORT	λ11	λ12	λ13	λ14
SECOND INPUT PORT	λ12	λ13	λ14	λ11
THIRD INPUT PORT	λ13	λ14	λ11	λ12
FOURTH INPUT PORT	λ14	λ11	λ12	λ13

FIG. 5

	FIRST OUTPUT PORT	SECOND OUTPUT PORT	THIRD OUTPUT PORT	FOURTH OUTPUT PORT
FIRST INPUT PORT	λ21	λ22	λ23	λ24
SECOND INPUT PORT	λ22	λ23	λ24	λ21
THIRD INPUT PORT	λ23	λ24	λ21	λ22
FOURTH INPUT PORT	λ24	λ21	λ22	λ23

FIG. 6

	FIRST OUTPUT PORT	SECOND OUTPUT PORT	THIRD OUTPUT PORT	FOURTH OUTPUT PORT
FIRST INPUT PORT	λ31	λ32	λ33	λ34
SECOND INPUT PORT	λ32	λ33	λ34	λ31
THIRD INPUT PORT	λ33	λ34	λ31	λ32
FOURTH INPUT PORT	λ34	λ31	λ32	λ33

FIG. 7

	FIRST OUTPUT PORT	SECOND OUTPUT PORT	THIRD OUTPUT PORT	FOURTH OUTPUT PORT
FIRST INPUT PORT	λ41	λ42	λ43	λ44
SECOND INPUT PORT	λ42	λ43	λ44	λ41
THIRD INPUT PORT	λ43	λ44	λ41	λ42
FOURTH INPUT PORT	λ44	λ41	λ42	λ43

FIG. 8

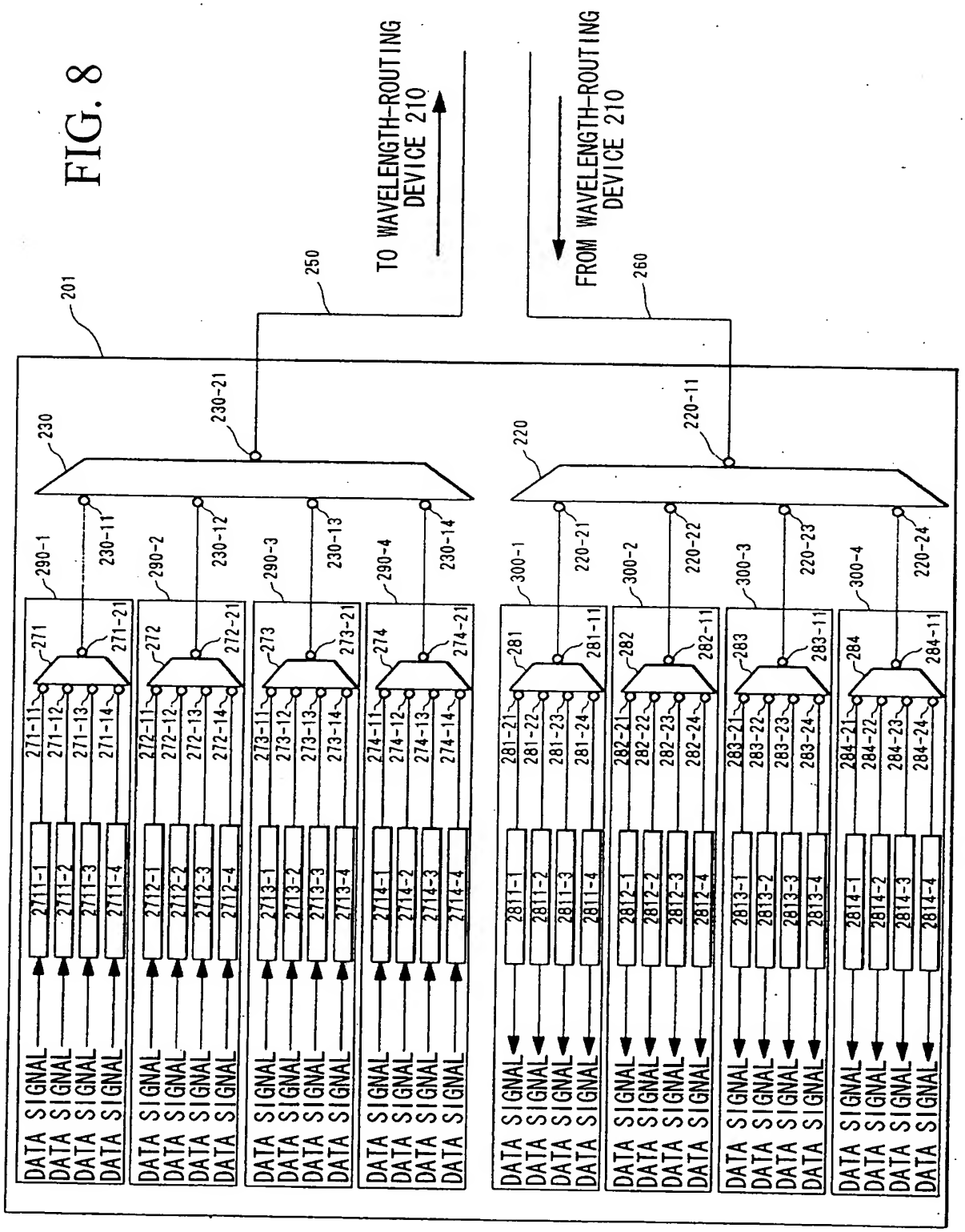

201
250
TO WAVELENGTH-ROUTING DEVICE 210
260
FROM WAVELENGTH-ROUTING DEVICE 210
230
230-21
230-11
230-12
230-13
230-14
220
220-11
220-21
220-22
220-23
220-24
290-1
290-2
290-3
290-4
300-1
300-2
300-3
300-4
271
272
273
274
281
282
283
284
271-11
271-12
271-13
271-14
271-21
272-11
272-12
272-13
272-14
272-21
273-11
273-12
273-13
273-14
273-21
274-11
274-12
274-13
274-14
274-21
281-11
281-21
281-22
281-23
281-24
282-11
282-21
282-22
282-23
282-24
283-11
283-21
283-22
283-23
283-24
284-11
284-21
284-22
284-23
284-24
2711-1
2711-2
2711-3
2711-4
2712-1
2712-2
2712-3
2712-4
2713-1
2713-2
2713-3
2713-4
2714-1
2714-2
2714-3
2714-4
2811-1
2811-2
2811-3
2811-4
2812-1
2812-2
2812-3
2812-4
2813-1
2813-2
2813-3
2813-4
2814-1
2814-2
2814-3
2814-4
DATA SIGNAL

FIG. 9

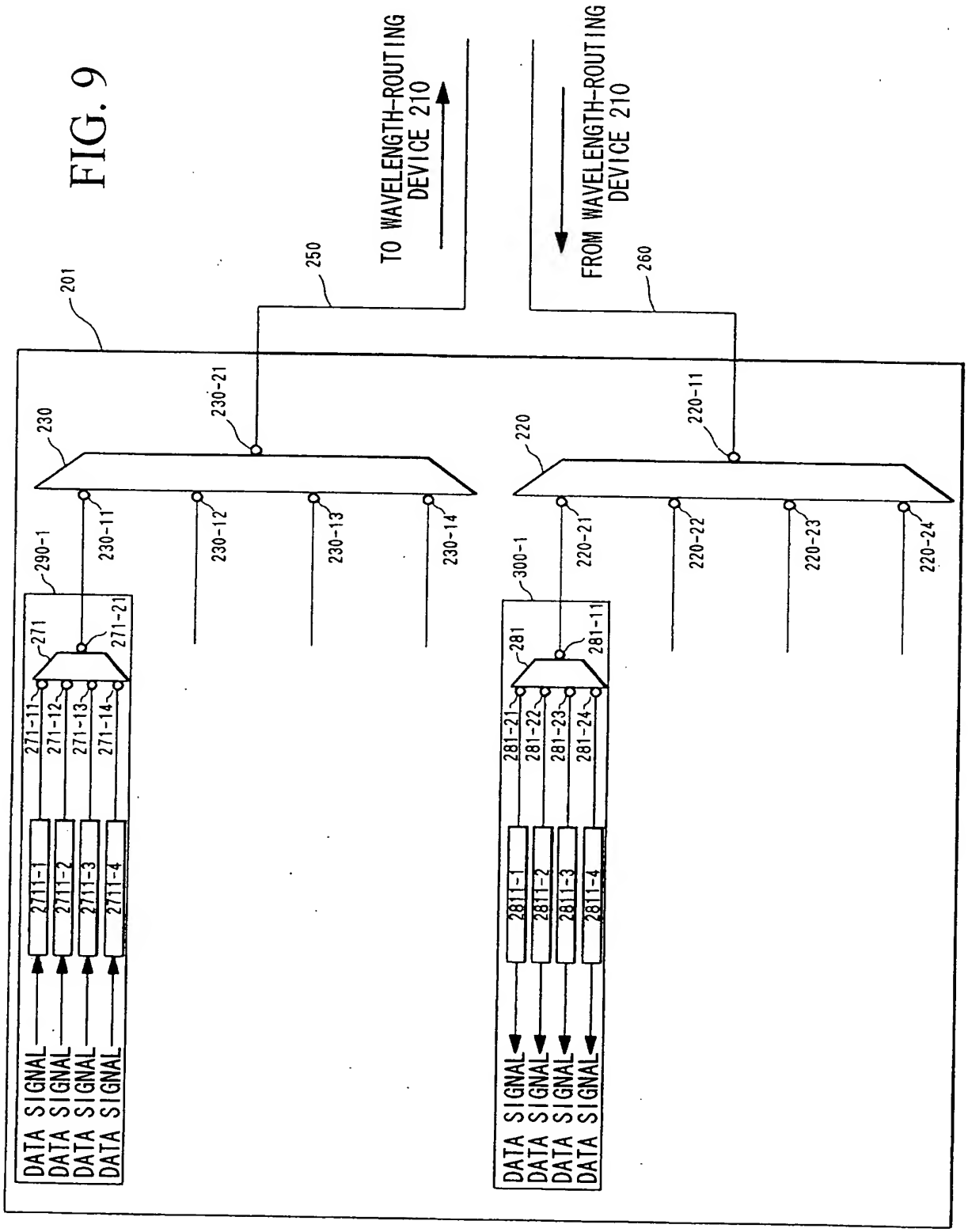

TO WAVELENGTH-ROUTING DEVICE 210
FROM WAVELENGTH-ROUTING DEVICE 210
201
250
260
230
230-21
220
220-11
230-11
230-12
230-13
230-14
220-21
220-22
220-23
220-24
290-1
300-1
271
271-21
281
281-11
271-11
271-12
271-13
271-14
281-21
281-22
281-23
281-24
2711-1
2711-2
2711-3
2711-4
2811-1
2811-2
2811-3
2811-4
DATA SIGNAL
DATA SIGNAL
DATA SIGNAL
DATA SIGNAL
DATA SIGNAL
DATA SIGNAL
DATA SIGNAL
DATA SIGNAL

FIG. 10

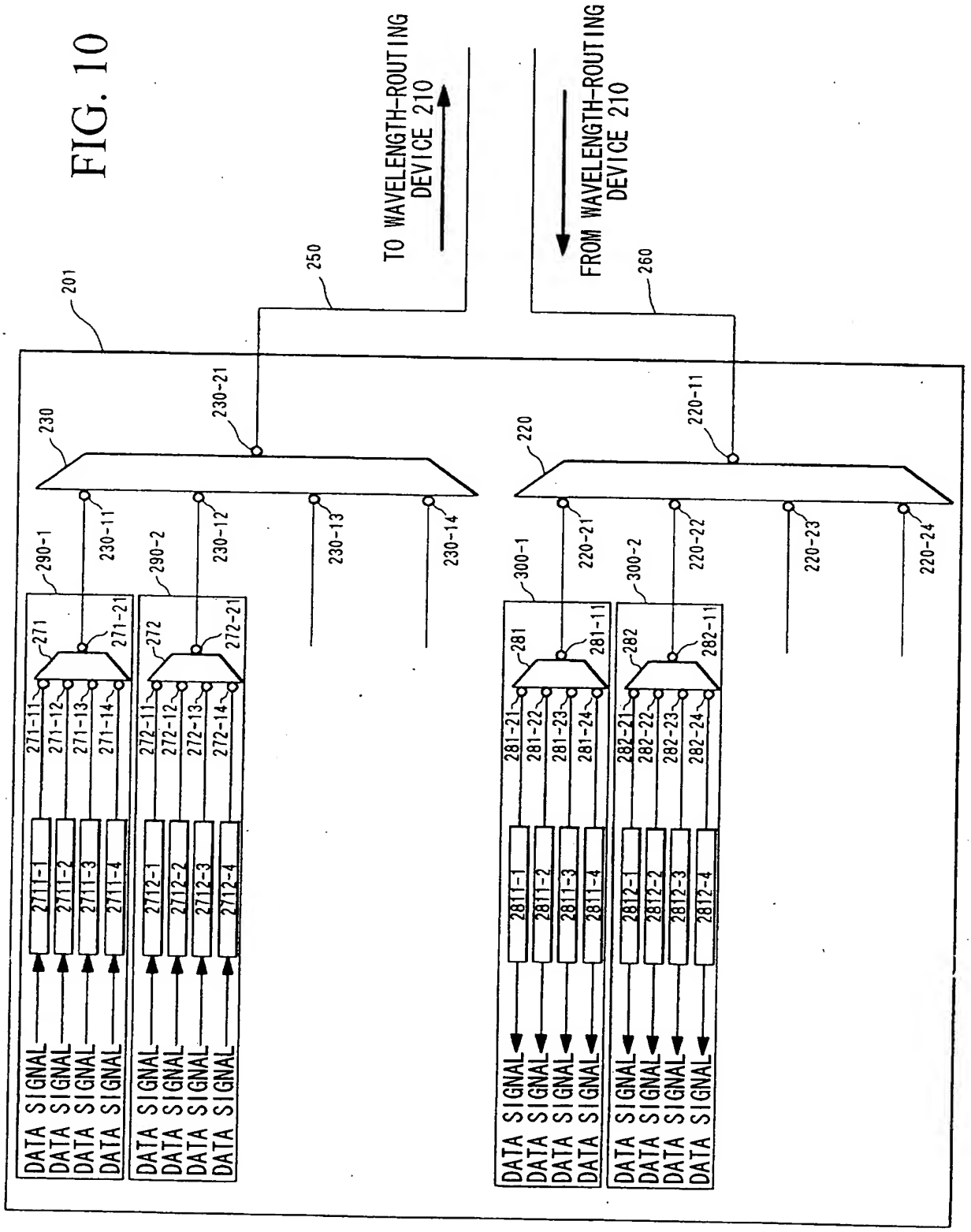

TO WAVELENGTH-ROUTING DEVICE 210
FROM WAVELENGTH-ROUTING DEVICE 210
201
250
260
230
230-21
220
220-11
290-1
290-2
300-1
300-2
271
272
281
282
271-21
272-21
281-11
282-11
230-11
230-12
230-13
230-14
220-21
220-22
220-23
220-24
271-11
271-12
271-13
271-14
272-11
272-12
272-13
272-14
281-21
281-22
281-23
281-24
282-21
282-22
282-23
282-24
2711-1
2711-2
2711-3
2711-4
2712-1
2712-2
2712-3
2712-4
2811-1
2811-2
2811-3
2811-4
2812-1
2812-2
2812-3
2812-4
DATA SIGNAL

FIG. 11

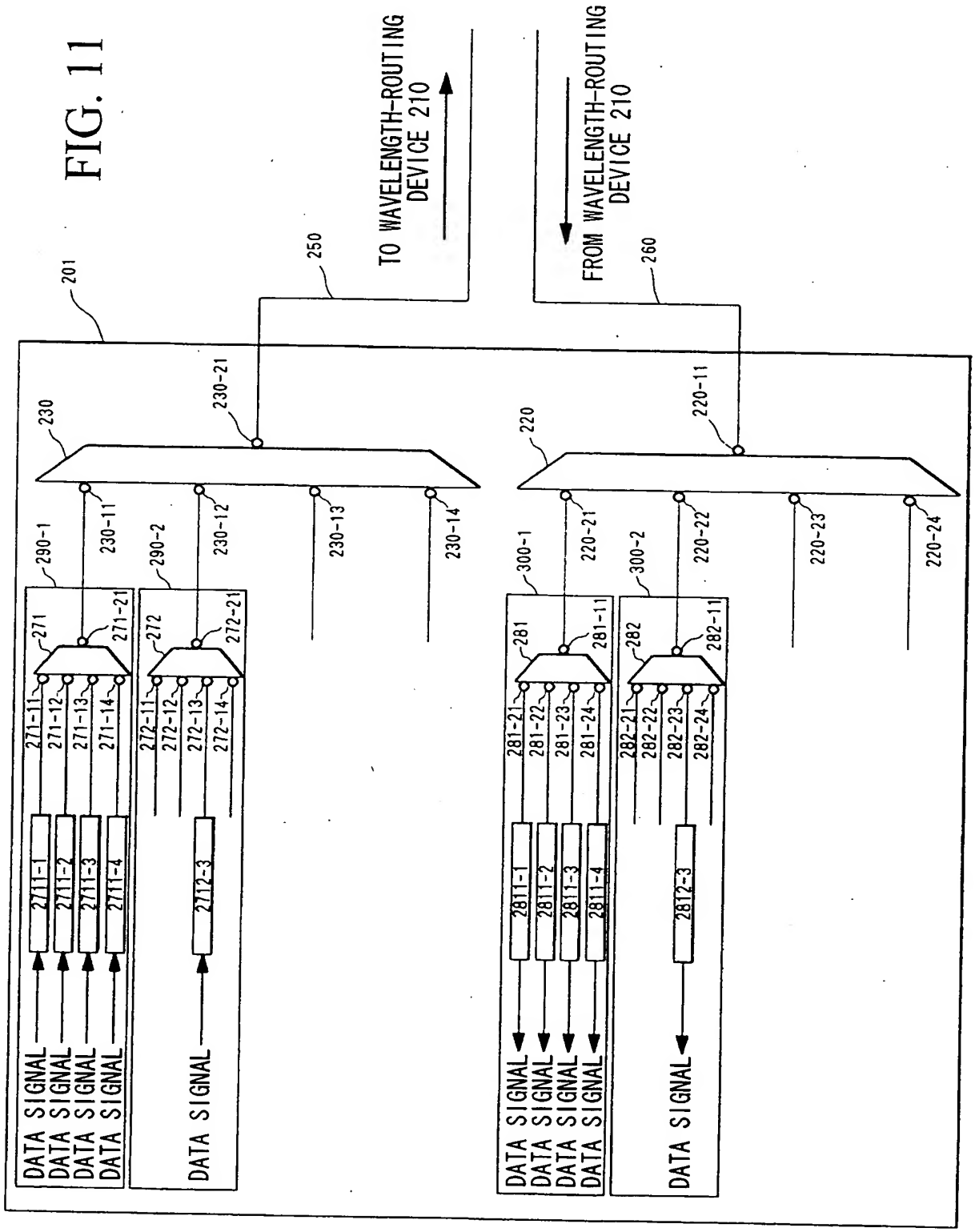

TO WAVELENGTH-ROUTING DEVICE 210
FROM WAVELENGTH-ROUTING DEVICE 210
201
250
260
230
230-21
220
220-11
230-11
230-12
230-13
230-14
220-21
220-22
220-23
220-24
290-1
290-2
300-1
300-2
271
271-21
272
272-21
281
281-11
282
282-11
271-11
271-12
271-13
271-14
272-11
272-12
272-13
272-14
281-21
281-22
281-23
281-24
282-21
282-22
282-23
282-24
2711-1
2711-2
2711-3
2711-4
2712-3
2811-1
2811-2
2811-3
2811-4
2812-3
DATA SIGNAL
DATA SIGNAL
DATA SIGNAL
DATA SIGNAL
DATA SIGNAL
DATA SIGNAL
DATA SIGNAL
DATA SIGNAL
DATA SIGNAL

FIG. 12

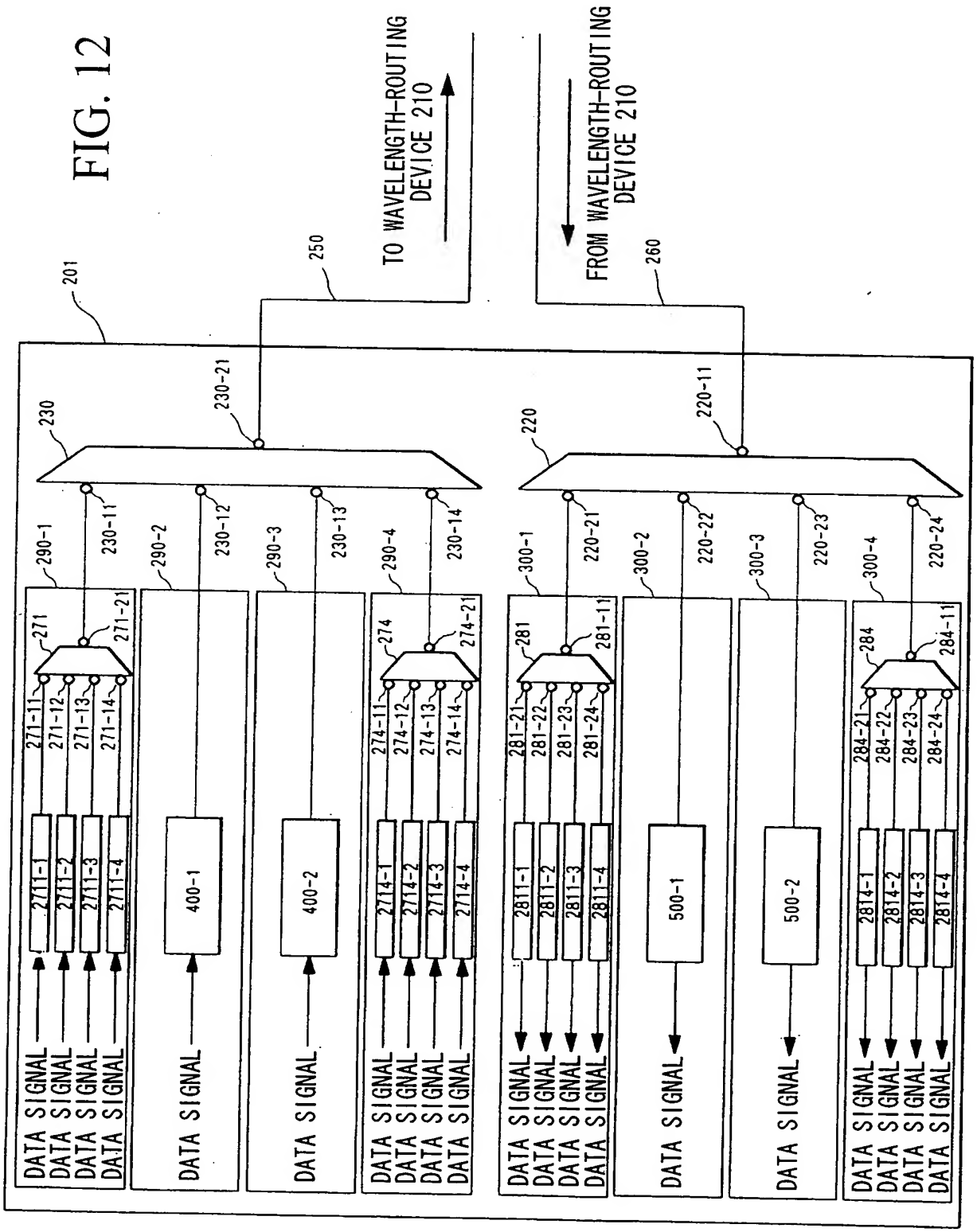
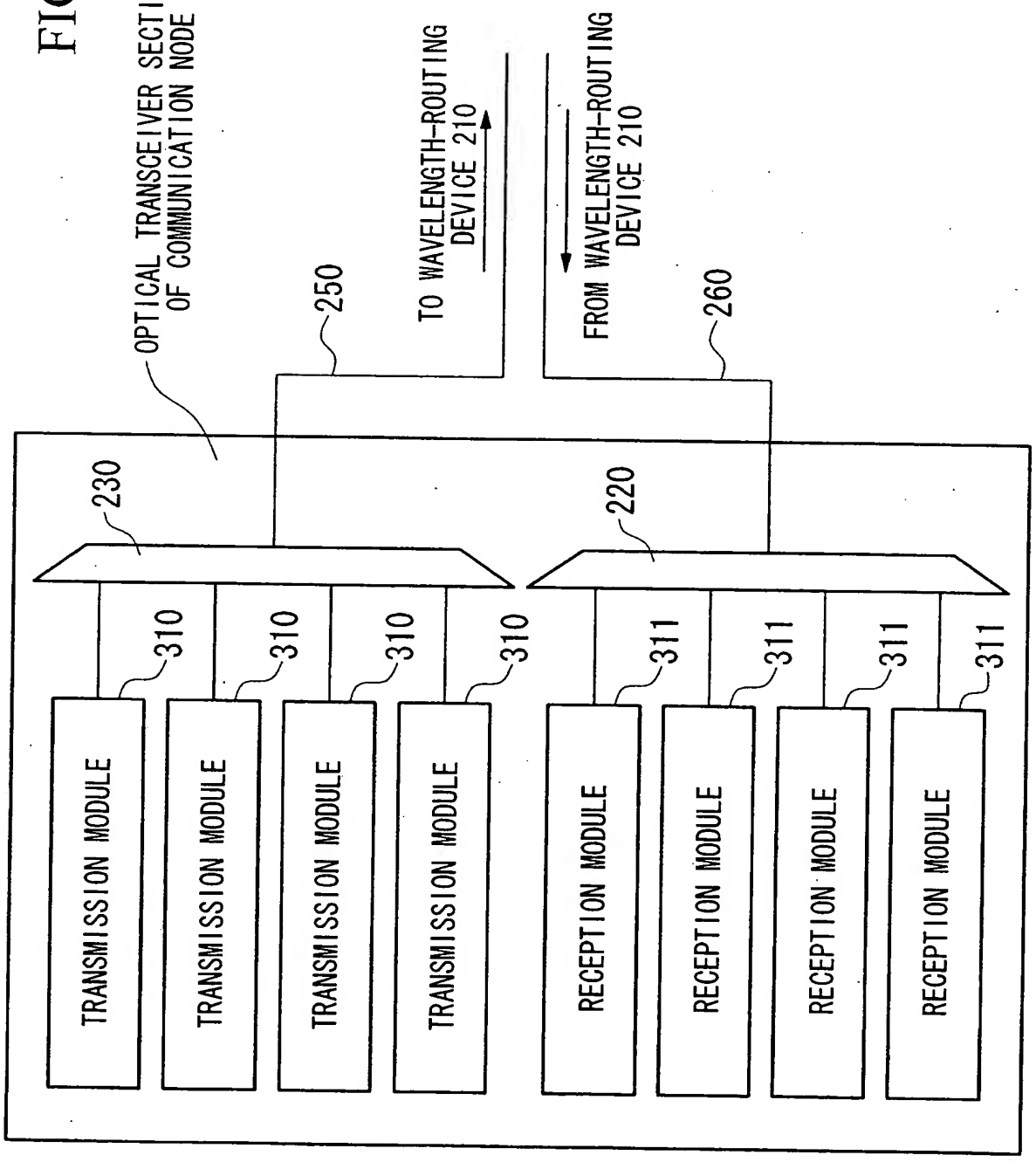

TO WAVELENGTH-ROUTING DEVICE 210
FROM WAVELENGTH-ROUTING DEVICE 210
201
250
260
230
230-21
220
220-11
290-1
290-2
290-3
290-4
300-1
300-2
300-3
300-4
230-11
230-12
230-13
230-14
220-21
220-22
220-23
220-24
271
271-21
274
274-21
281
281-11
284
284-11
271-11
271-12
271-13
271-14
274-11
274-12
274-13
274-14
281-21
281-22
281-23
281-24
284-21
284-22
284-23
284-24
2711-1
2711-2
2711-3
2711-4
2714-1
2714-2
2714-3
2714-4
2811-1
2811-2
2811-3
2811-4
2814-1
2814-2
2814-3
2814-4
400-1
400-2
500-1
500-2
DATA SIGNAL

FIG. 13


OPTICAL TRANSCEIVER SECTION OF COMMUNICATION NODE
TO WAVELENGTH-ROUTING DEVICE 210
FROM WAVELENGTH-ROUTING DEVICE 210
250
260
230
220
310
311
TRANSMISSION MODULE
RECEPTION MODULE

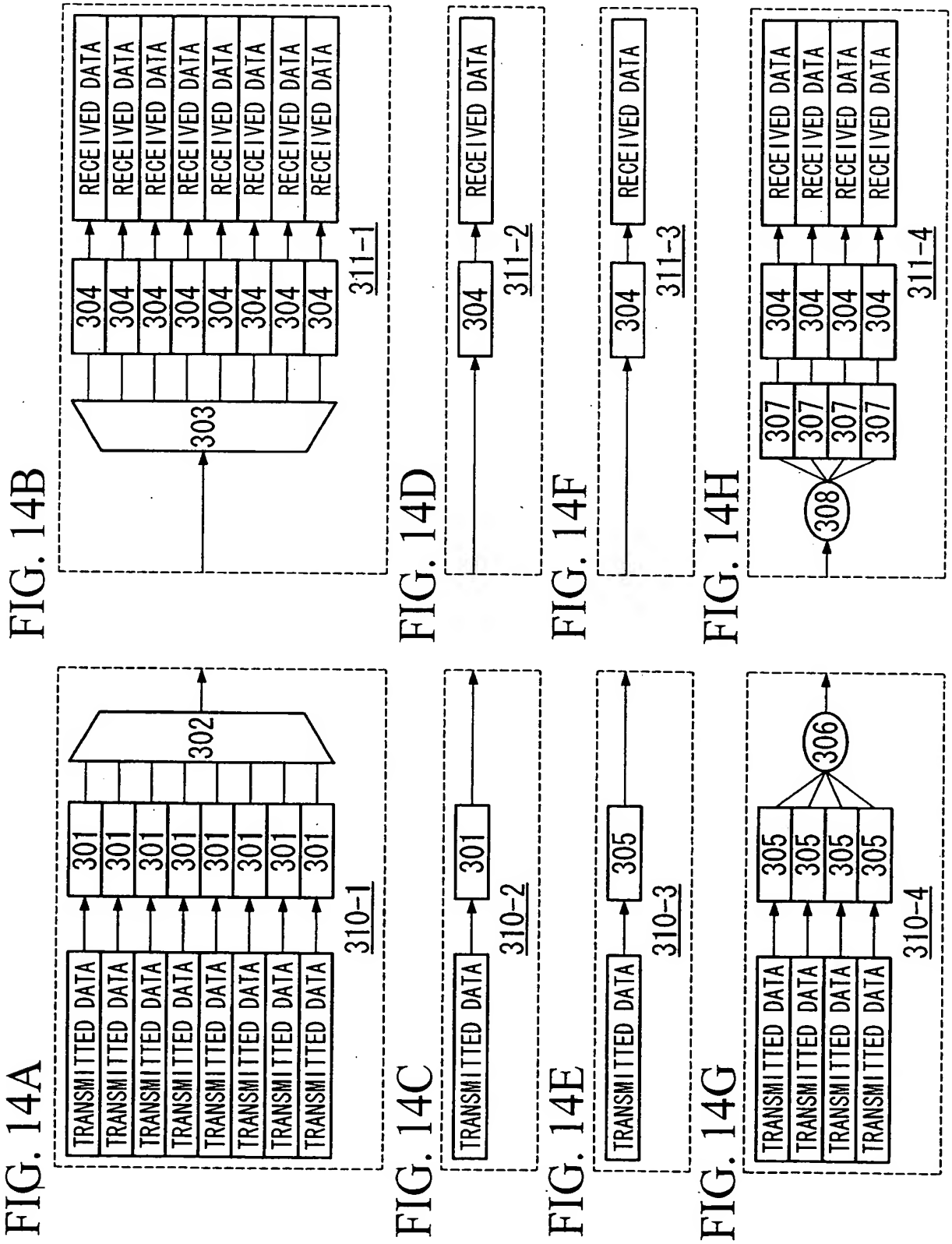


FIG. 14B FIG. 14D FIG. 14F FIG. 14H

FIG. 14A FIG. 14C FIG. 14E FIG. 14G

FIG. 15

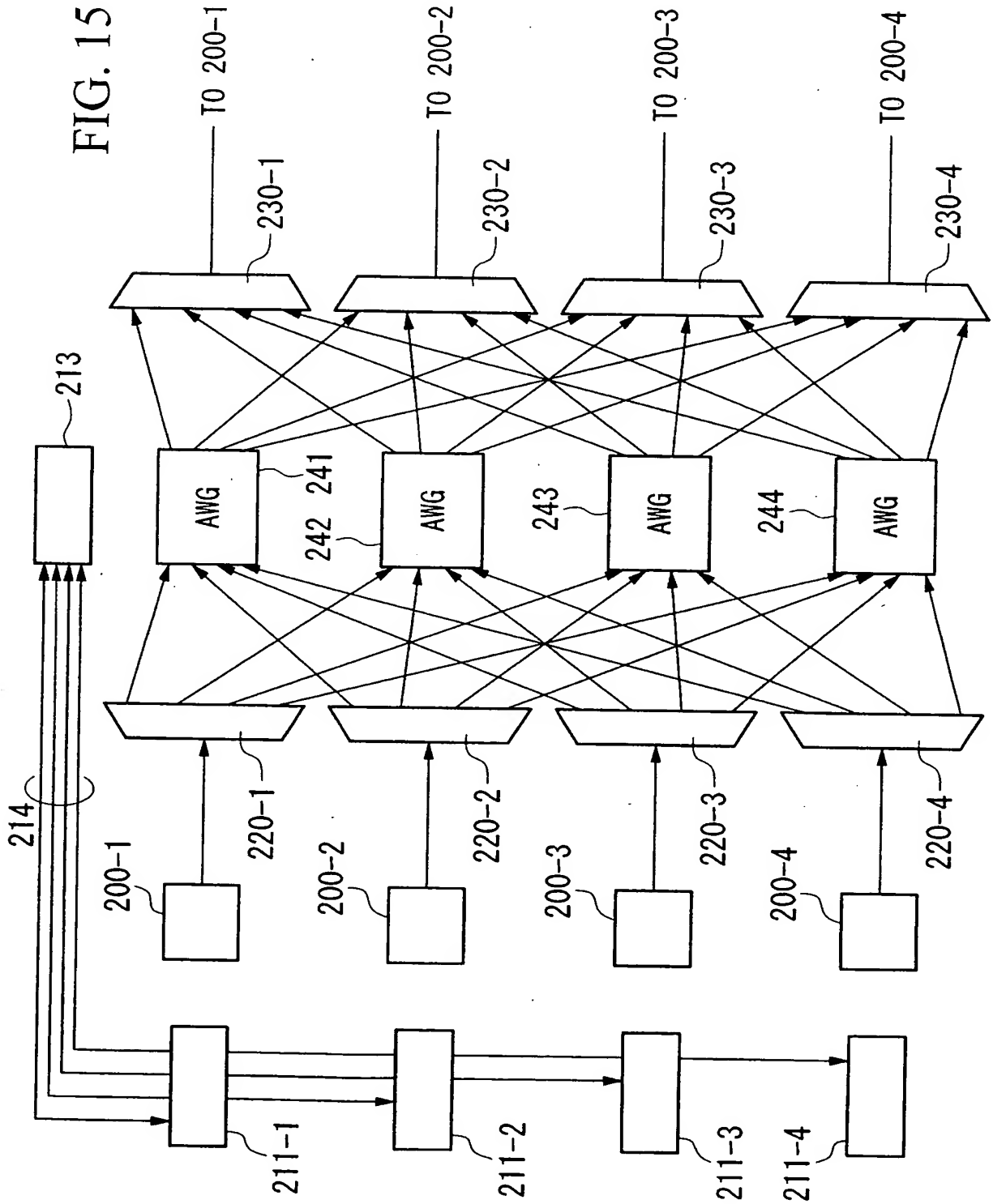

TO 200-1
TO 200-2
TO 200-3
TO 200-4
230-1
230-2
230-3
230-4
213
AWG
241
242
243
244
214
220-1
220-2
220-3
220-4
200-1
200-2
200-3
200-4
211-1
211-2
211-3
211-4

FIG. 16

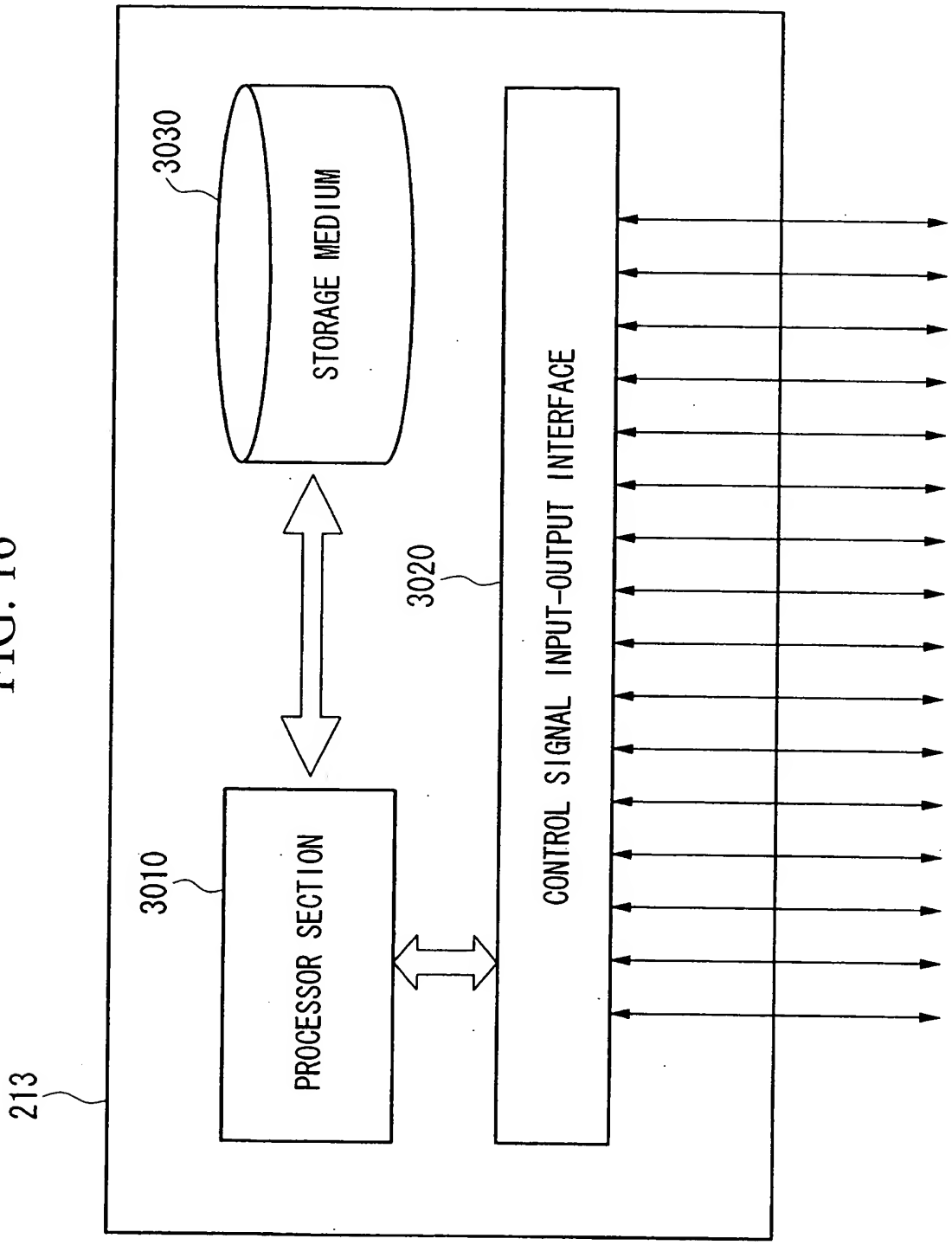

213
3030
STORAGE MEDIUM
3020
CONTROL SIGNAL INPUT-OUTPUT INTERFACE
3010
PROCESSOR SECTION

FIG. 17

	TO 200-1	TO 200-2	TO 200-3	TO 200-4	MODULE NUMBER	TOTAL TLD NUMBER	NUMBER OF TLD IN USE
FROM 200-1	λ11 NA	λ12 NA	λ13 OFF	λ14 ON	1	0	0
FROM 200-2	λ12 NA	λ13 NA	λ14 ON	λ11 NA	2	0	0
FROM 200-3	λ13 OFF	λ14 1	λ11 OFF	λ12 OFF	3	1	1
FROM 200-4	λ14 1	λ11 OFF	λ12 OFF	λ13 OFF	4	2	1
WAVELENGTH BAND $\lambda B_1 \pm \Delta \lambda_1$							

FIG. 18

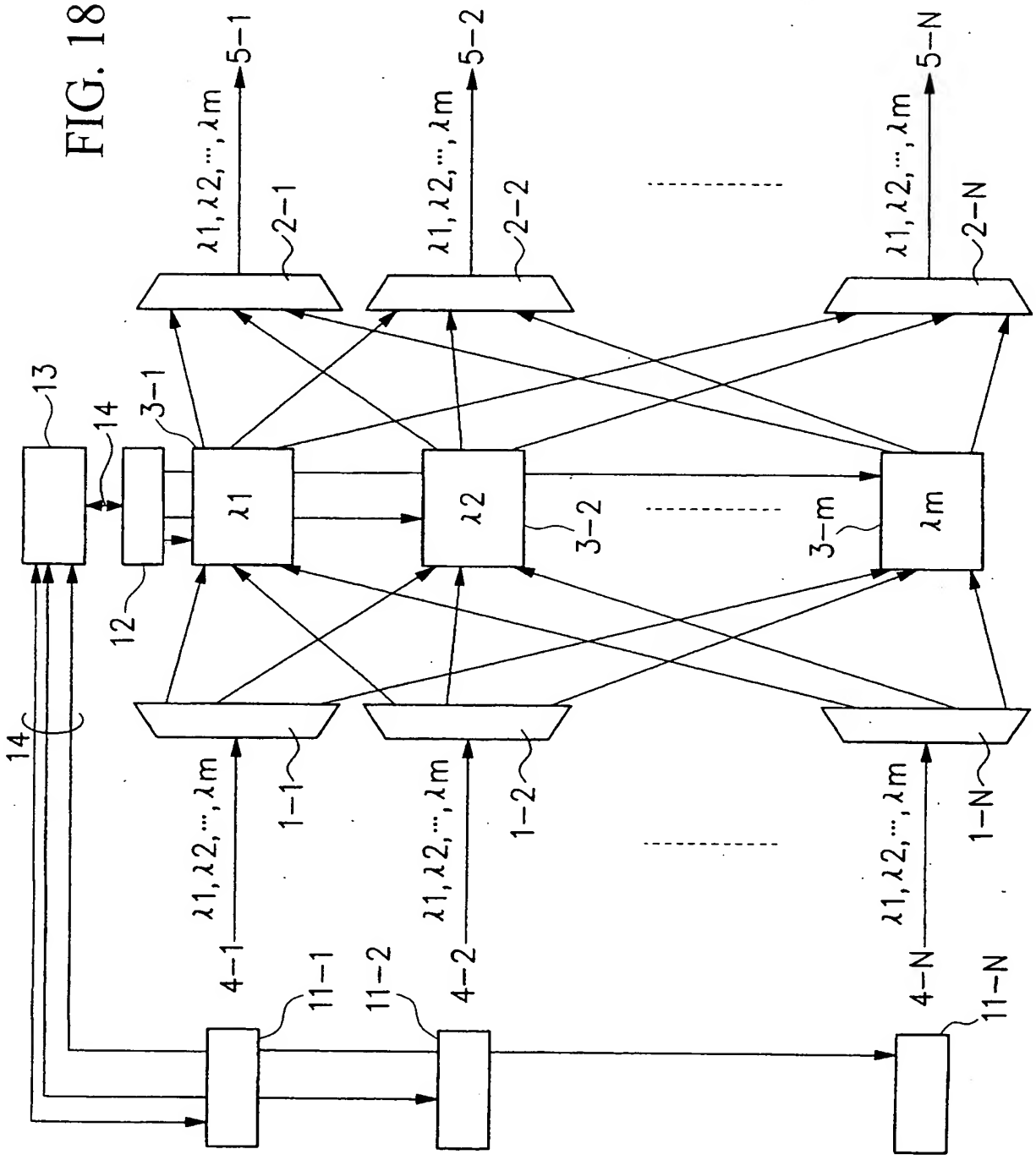

λ1,λ2,…,λm
5-1
2-1
5-2
2-2
5-N
2-N
13
14
3-1
λ1
λ2
λm
3-2
3-m
12
1-1
1-2
1-N
4-1
4-2
4-N
11-1
11-2
11-N

FIG. 19A

1	
INPUT COMMUNICATION NODE	DESTINATION COMMUNICATION NODE OF OPTICAL PATH
1	3
2	0
3	1
4	0
5	0
6	0
7	0
8	0

TABLE GIVING OPTICAL PATH OF λ1

FIG. 19B

2	
INPUT COMMUNICATION NODE	DESTINATION COMMUNICATION NODE OF OPTICAL PATH
1	0
2	5
3	0
4	0
5	2
6	0
7	0
8	0

TABLE GIVING OPTICAL PATH OF λ2

FIG. 19C

3	
INPUT COMMUNICATION NODE	DESTINATION COMMUNICATION NODE OF OPTICAL PATH
1	0
2	8
3	0
4	0
5	0
6	0
7	0
8	2

TABLE GIVING OPTICAL PATH OF λ3

FIG. 19D

4	
INPUT COMMUNICATION NODE	DESTINATION COMMUNICATION NODE OF OPTICAL PATH
1	3
2	0
3	1
4	0
5	0
6	0
7	0
8	0

TABLE GIVING OPTICAL PATH OF λ4

"0" MEANS THAT RELEVANT COMMUNICATION NODE IS NOT IN USE

Title: OPTICAL COMMUNICATION NETWORK SYSTEM, WAVELENGTH-ROUTING DEVICE, COMMUNICATION NODE, AND OPTICAL PATH MANAGEMENT METHOD AND DEVICE FOR OPTICAL CROSS CONNECT DEVICE
Inventor(s): Osamu MORIWAKI, et al
Atty. Ref.: 5259-046/NP
10/522831

FIG. 20

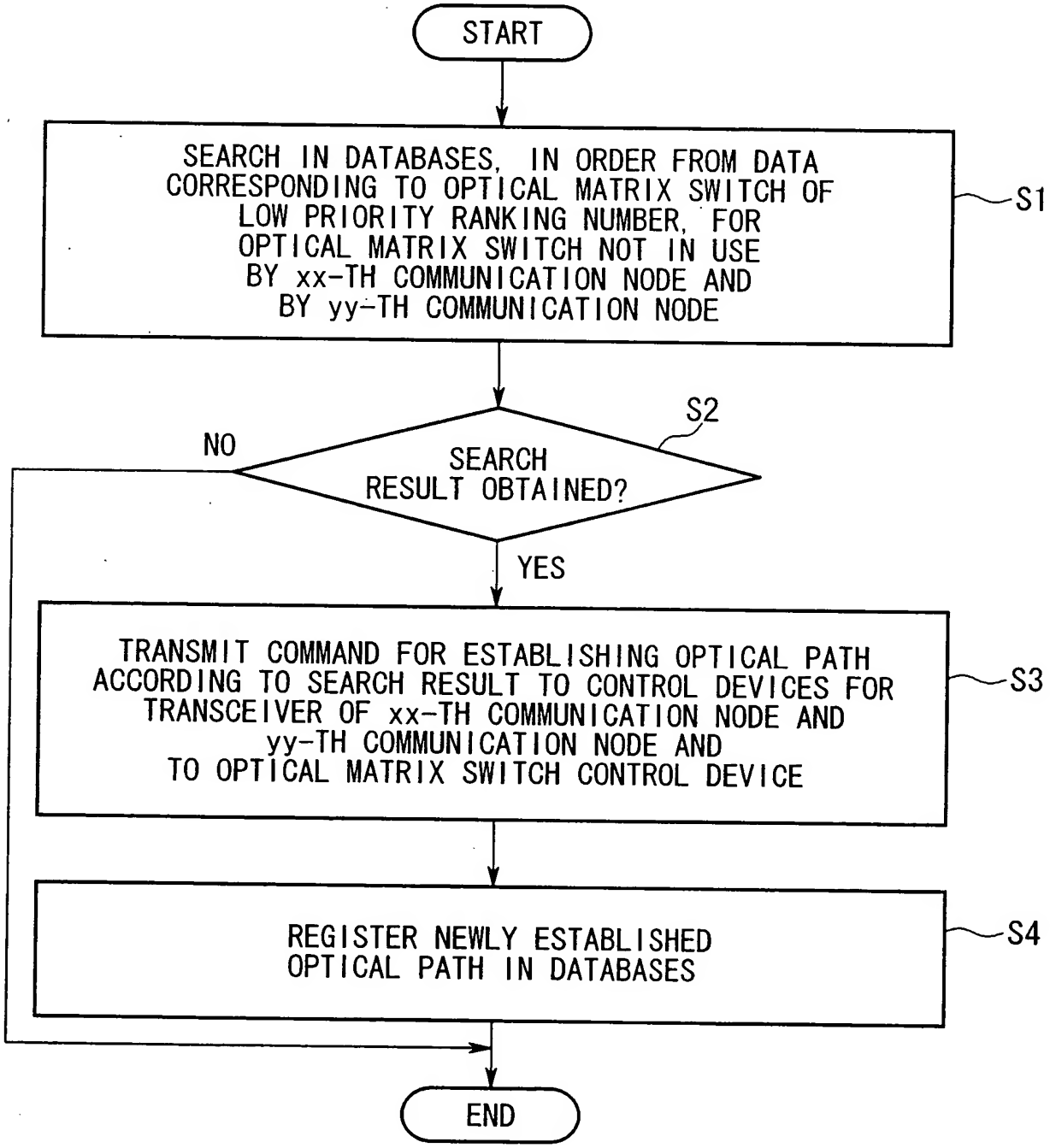

START
SEARCH IN DATABASES, IN ORDER FROM DATA CORRESPONDING TO OPTICAL MATRIX SWITCH OF LOW PRIORITY RANKING NUMBER, FOR OPTICAL MATRIX SWITCH NOT IN USE BY xx-TH COMMUNICATION NODE AND BY yy-TH COMMUNICATION NODE
S1
S2
SEARCH RESULT OBTAINED?
NO
YES
TRANSMIT COMMAND FOR ESTABLISHING OPTICAL PATH ACCORDING TO SEARCH RESULT TO CONTROL DEVICES FOR TRANSCEIVER OF xx-TH COMMUNICATION NODE AND yy-TH COMMUNICATION NODE AND TO OPTICAL MATRIX SWITCH CONTROL DEVICE
S3
REGISTER NEWLY ESTABLISHED OPTICAL PATH IN DATABASES
S4
END

FIG. 21

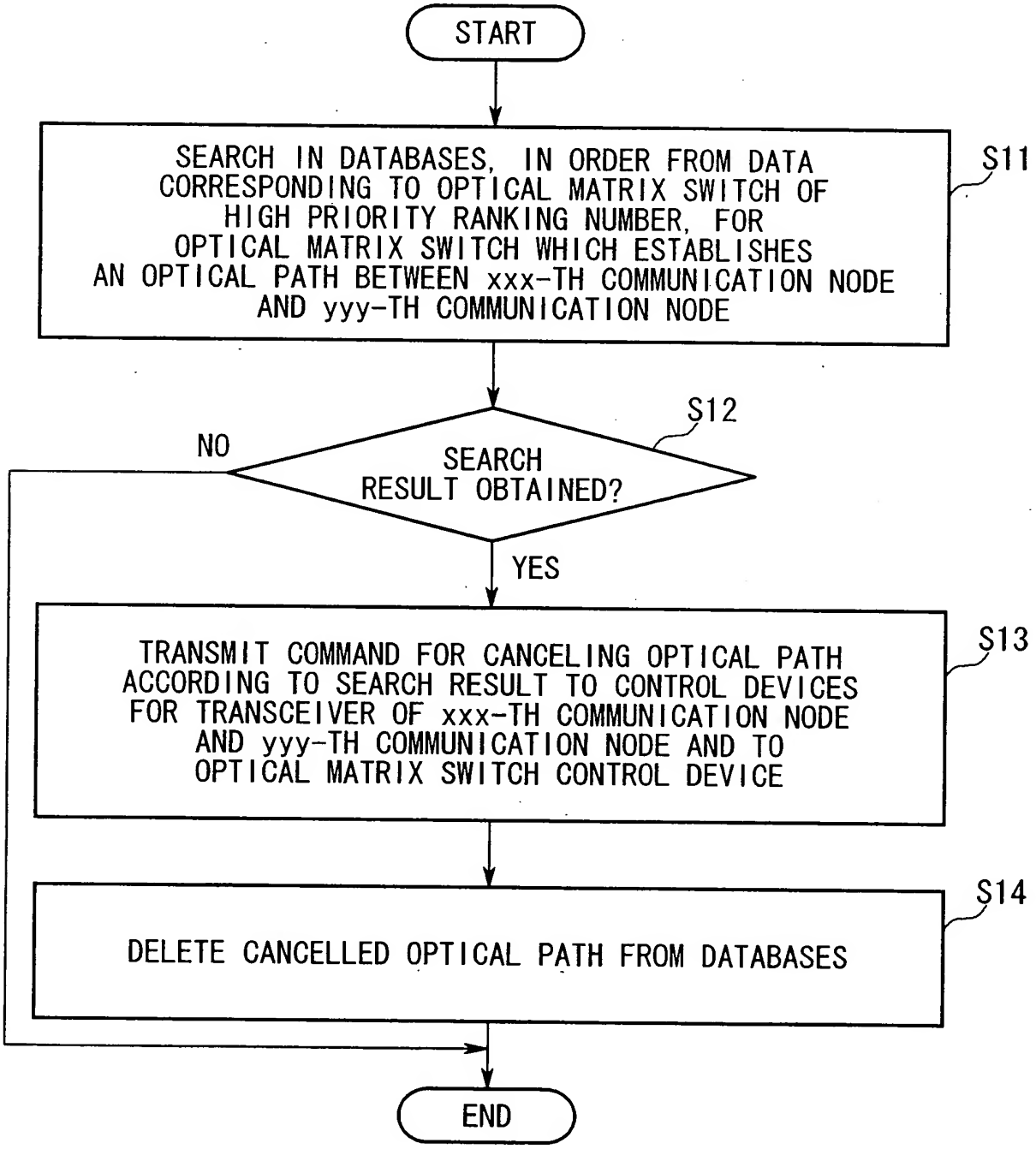

START
SEARCH IN DATABASES, IN ORDER FROM DATA CORRESPONDING TO OPTICAL MATRIX SWITCH OF HIGH PRIORITY RANKING NUMBER, FOR OPTICAL MATRIX SWITCH WHICH ESTABLISHES AN OPTICAL PATH BETWEEN xxx-TH COMMUNICATION NODE AND yyy-TH COMMUNICATION NODE
S11
S12
NO
SEARCH RESULT OBTAINED?
YES
TRANSMIT COMMAND FOR CANCELING OPTICAL PATH ACCORDING TO SEARCH RESULT TO CONTROL DEVICES FOR TRANSCEIVER OF xxx-TH COMMUNICATION NODE AND yyy-TH COMMUNICATION NODE AND TO OPTICAL MATRIX SWITCH CONTROL DEVICE
S13
DELETE CANCELLED OPTICAL PATH FROM DATABASES
S14
END

FIG. 22

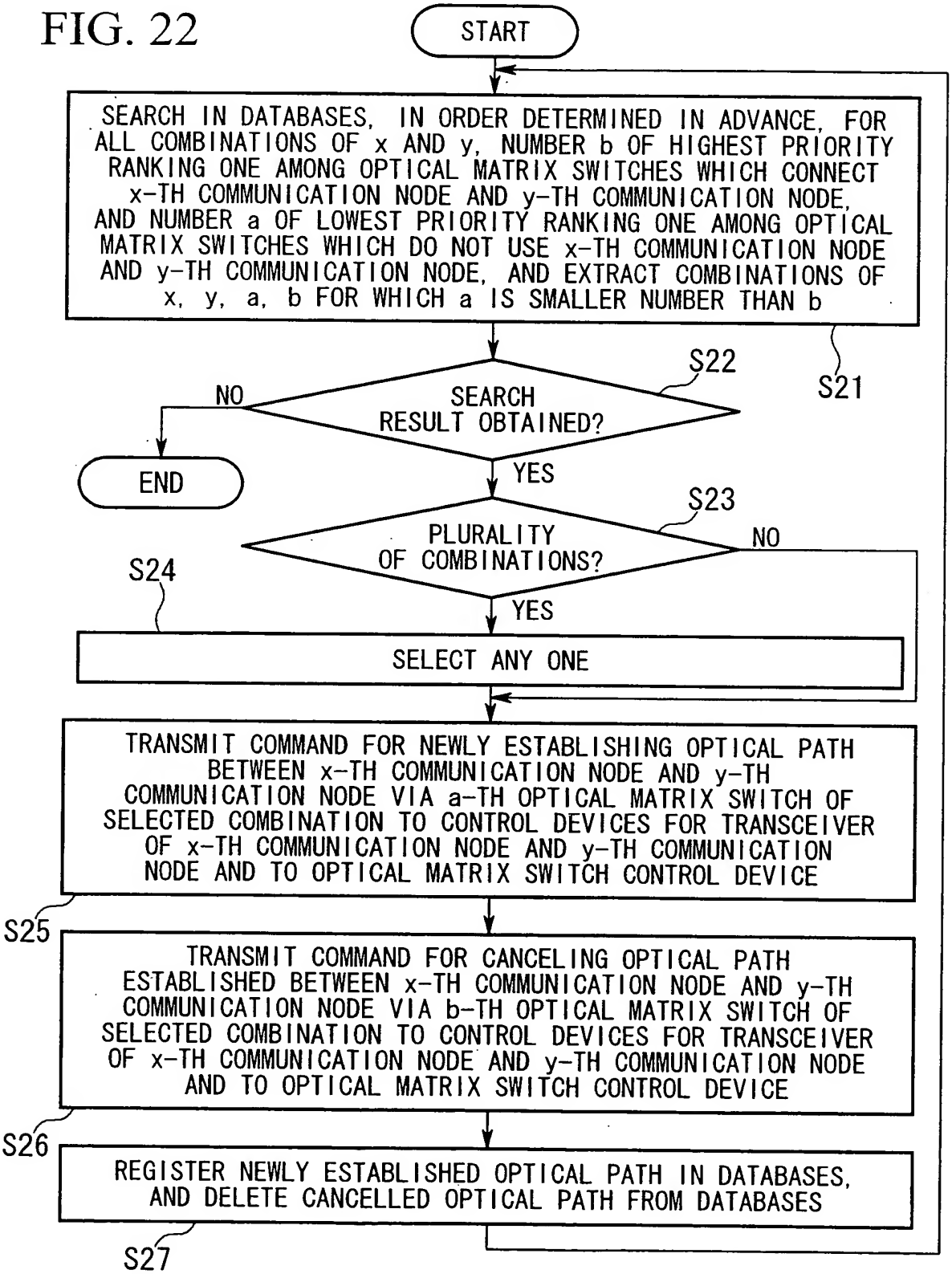

START
SEARCH IN DATABASES, IN ORDER DETERMINED IN ADVANCE, FOR ALL COMBINATIONS OF x AND y, NUMBER b OF HIGHEST PRIORITY RANKING ONE AMONG OPTICAL MATRIX SWITCHES WHICH CONNECT x-TH COMMUNICATION NODE AND y-TH COMMUNICATION NODE, AND NUMBER a OF LOWEST PRIORITY RANKING ONE AMONG OPTICAL MATRIX SWITCHES WHICH DO NOT USE x-TH COMMUNICATION NODE AND y-TH COMMUNICATION NODE, AND EXTRACT COMBINATIONS OF x, y, a, b FOR WHICH a IS SMALLER NUMBER THAN b
S21
S22
SEARCH RESULT OBTAINED?
NO
END
YES
S23
PLURALITY OF COMBINATIONS?
NO
YES
S24
SELECT ANY ONE
TRANSMIT COMMAND FOR NEWLY ESTABLISHING OPTICAL PATH BETWEEN x-TH COMMUNICATION NODE AND y-TH COMMUNICATION NODE VIA a-TH OPTICAL MATRIX SWITCH OF SELECTED COMBINATION TO CONTROL DEVICES FOR TRANSCEIVER OF x-TH COMMUNICATION NODE AND y-TH COMMUNICATION NODE AND TO OPTICAL MATRIX SWITCH CONTROL DEVICE
S25
TRANSMIT COMMAND FOR CANCELING OPTICAL PATH ESTABLISHED BETWEEN x-TH COMMUNICATION NODE AND y-TH COMMUNICATION NODE VIA b-TH OPTICAL MATRIX SWITCH OF SELECTED COMBINATION TO CONTROL DEVICES FOR TRANSCEIVER OF x-TH COMMUNICATION NODE AND y-TH COMMUNICATION NODE AND TO OPTICAL MATRIX SWITCH CONTROL DEVICE
S26
REGISTER NEWLY ESTABLISHED OPTICAL PATH IN DATABASES, AND DELETE CANCELLED OPTICAL PATH FROM DATABASES
S27

FIG. 23

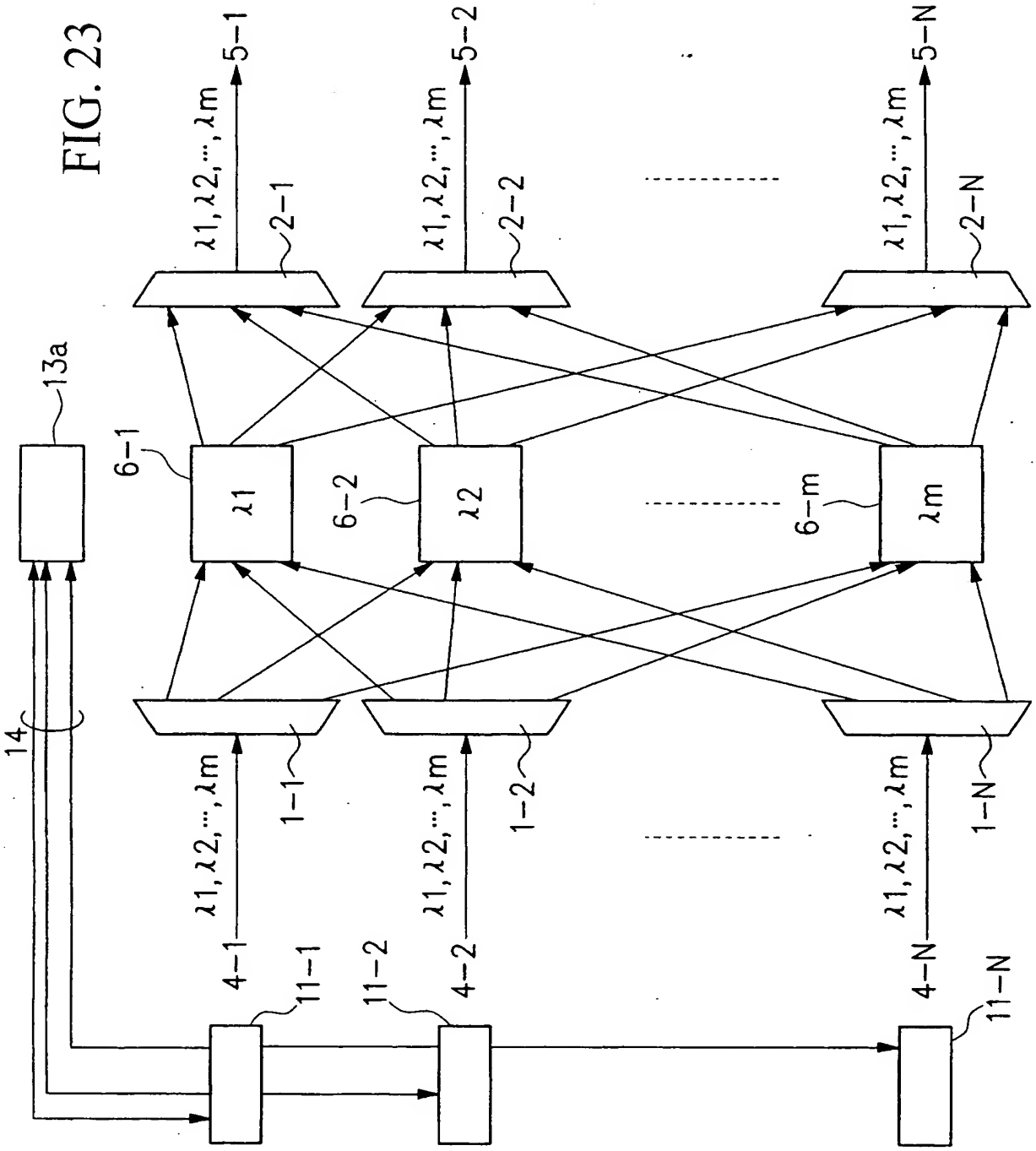

λ1, λ2, ···, λm
5-1
5-2
5-N
2-1
2-2
2-N
13a
6-1
6-2
6-m
λ1
λ2
λm
14
1-1
1-2
1-N
4-1
4-2
4-N
11-1
11-2
11-N

FIG. 24

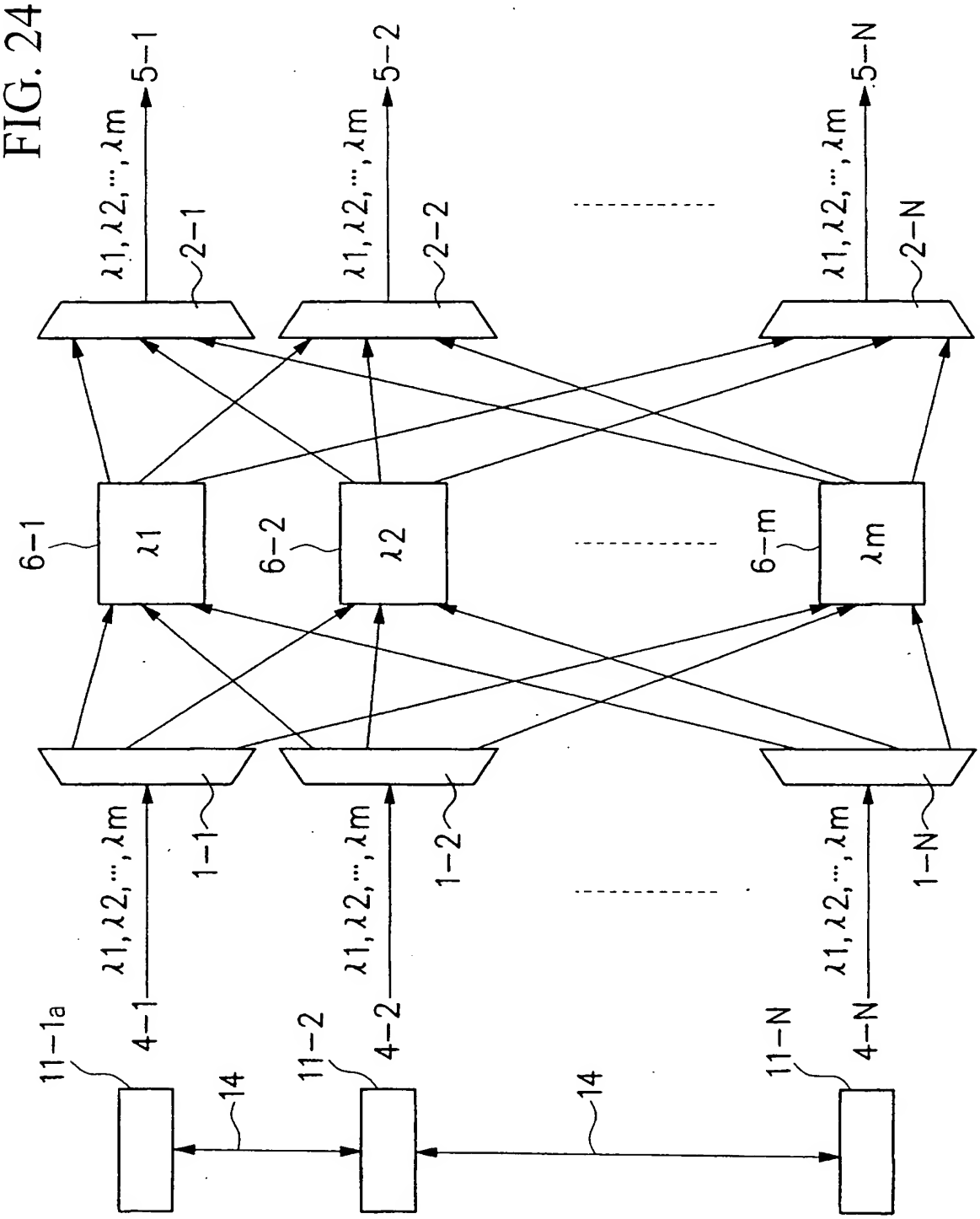

λ1,λ2,…,λm
5-1
2-1
5-2
2-2
5-N
2-N
6-1
λ1
6-2
λ2
6-m
λm
1-1
1-2
1-N
4-1
4-2
4-N
11-1a
11-2
11-N
14
14

FIG. 25

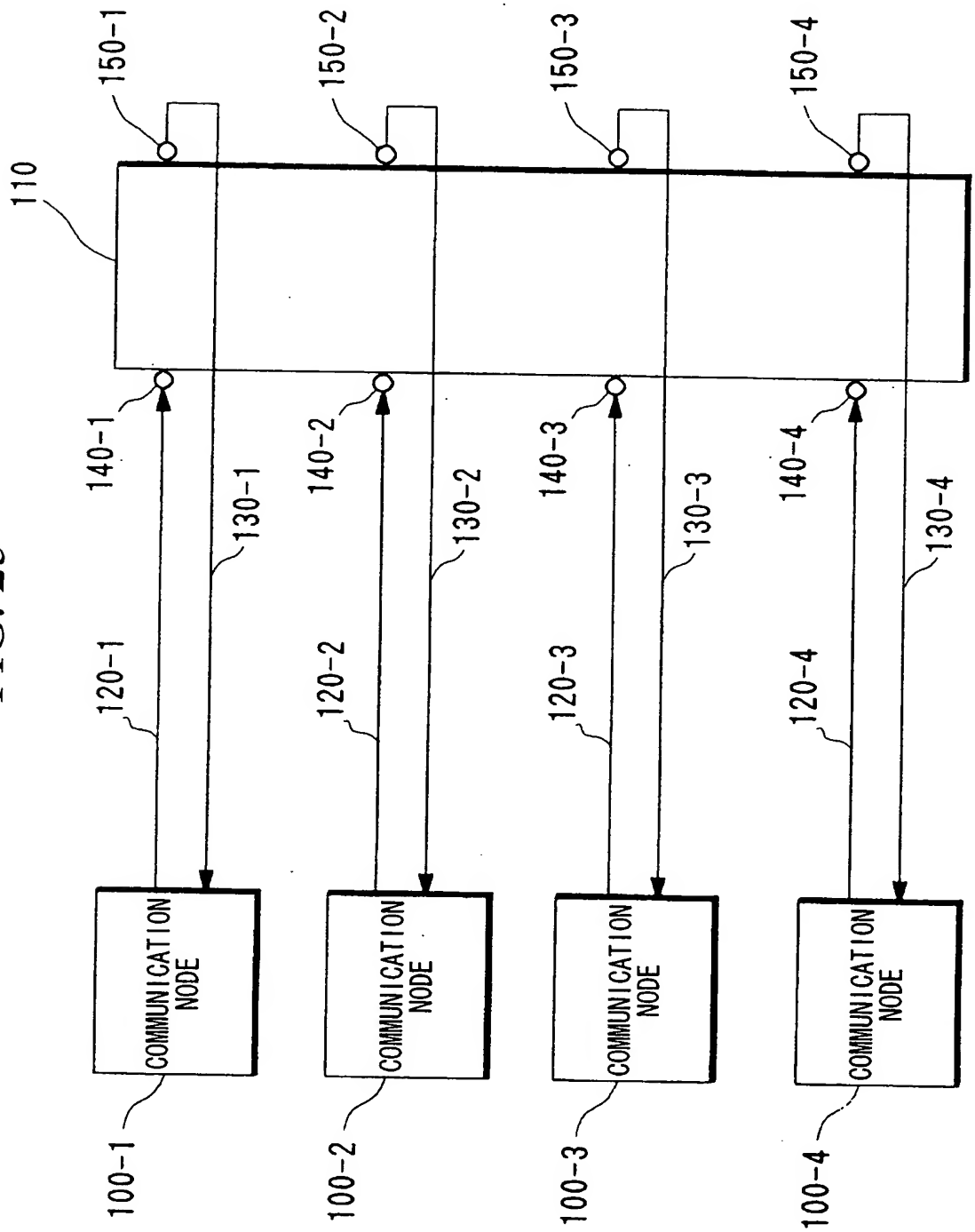

110
150-1
150-2
150-3
150-4
140-1
140-2
140-3
140-4
130-1
130-2
130-3
130-4
120-1
120-2
120-3
120-4
COMMUNICATION NODE
COMMUNICATION NODE
COMMUNICATION NODE
COMMUNICATION NODE
100-1
100-2
100-3
100-4

FIG. 26

INPUT PORT \ OUTPUT PORT	150-1	150-2	150-3	150-4
140-1	λ1	λ2	λ3	λ4
140-2	λ2	λ3	λ4	λ1
140-3	λ3	λ4	λ1	λ2
140-4	λ4	λ1	λ2	λ3

FIG. 27

INPUT PORT \ OUTPUT PORT	150-1	150-2	150-3	150-4
140-1	λ1	λ2	λ3	λ4
140-2	λ2	λ3	λ4	λ5
140-3	λ3	λ4	λ5	λ6
140-4	λ4	λ5	λ6	λ7

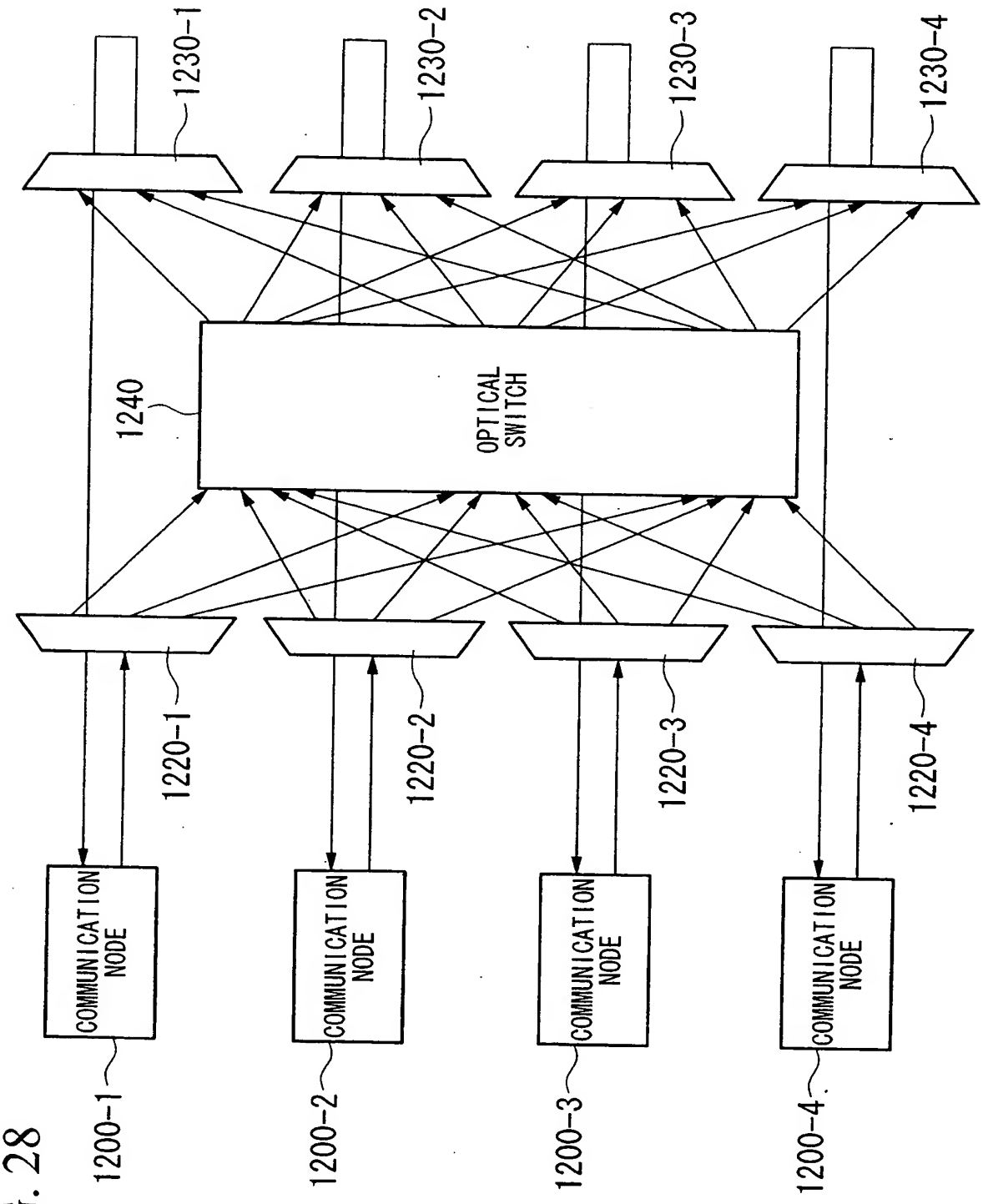

1230-1
1230-2
1230-3
1230-4
1240
OPTICAL SWITCH
1220-1
1220-2
1220-3
1220-4
COMMUNICATION NODE
COMMUNICATION NODE
COMMUNICATION NODE
COMMUNICATION NODE
1200-1
1200-2
1200-3
1200-4

FIG. 28

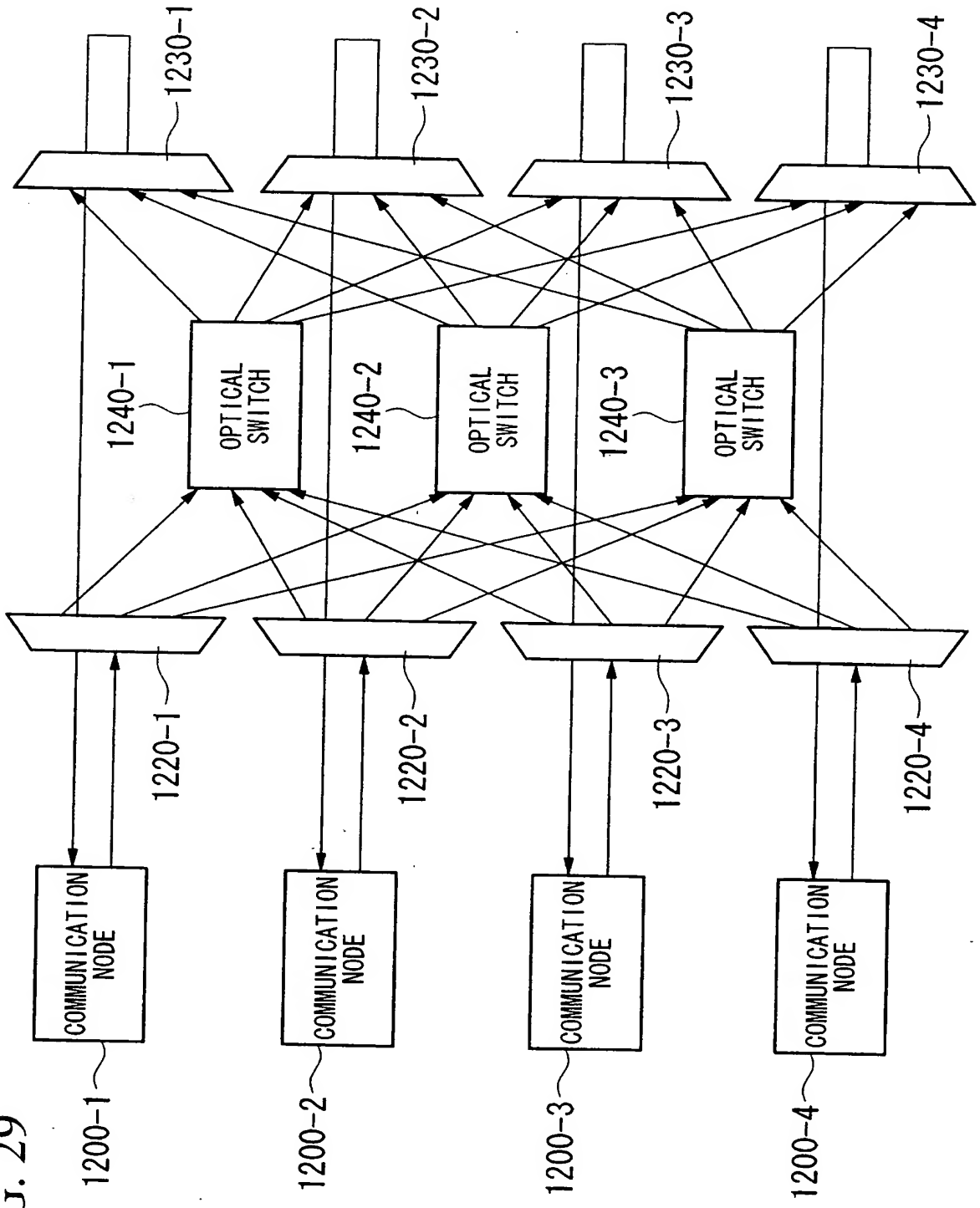

1230-1
1230-2
1230-3
1230-4
1240-1
OPTICAL SWITCH
1240-2
OPTICAL SWITCH
1240-3
OPTICAL SWITCH
1220-1
1220-2
1220-3
1220-4
COMMUNICATION NODE
COMMUNICATION NODE
COMMUNICATION NODE
COMMUNICATION NODE
1200-1
1200-2
1200-3
1200-4

FIG. 29

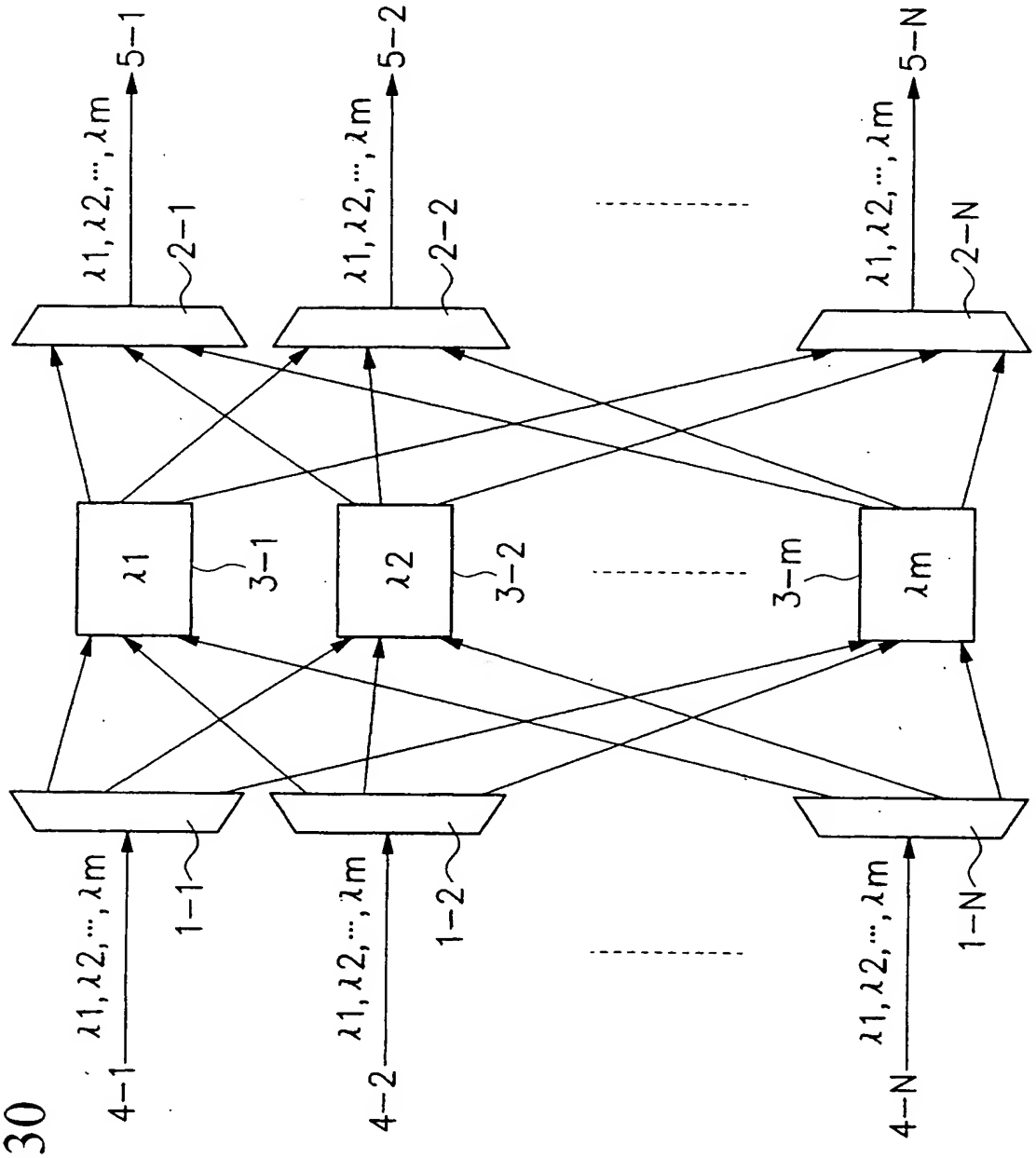


FIG. 30

FIG. 31A

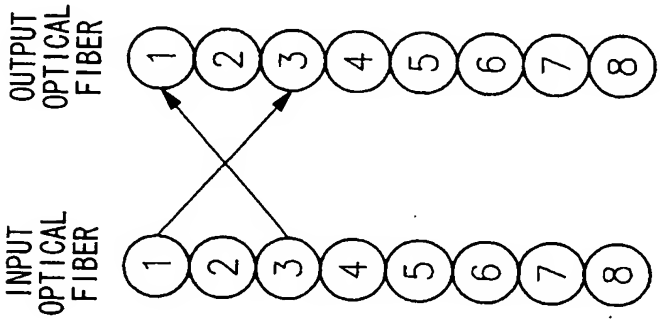


FIG. 31B

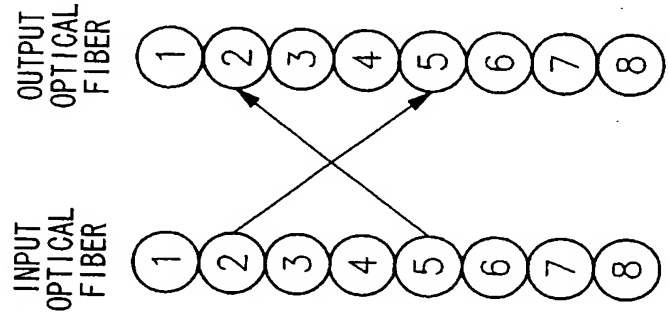


FIG. 31C

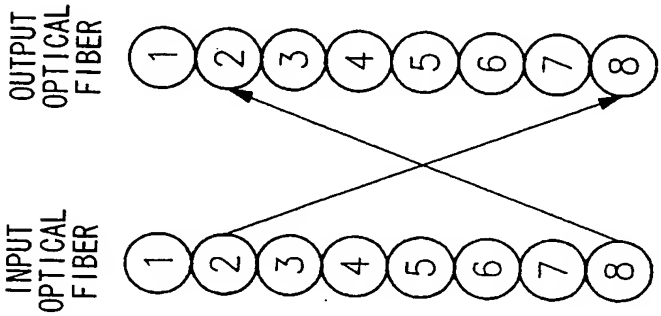


FIG. 31D

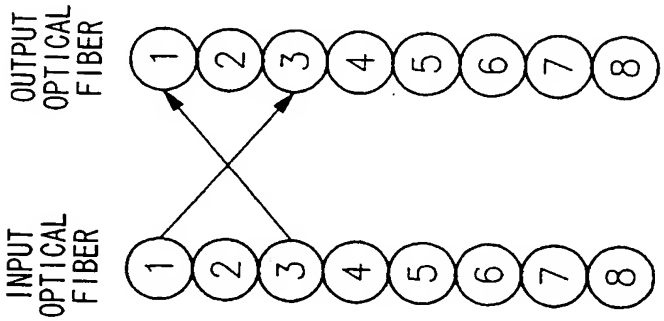


FIG. 32A

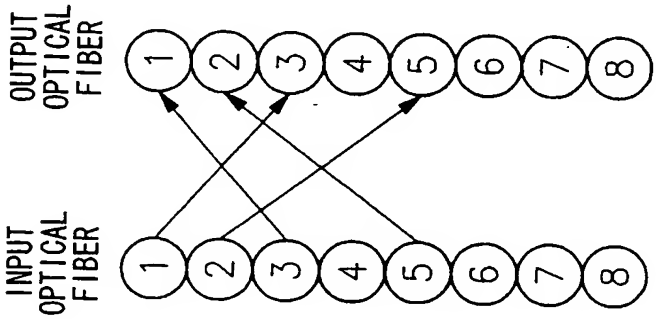


FIG. 32B

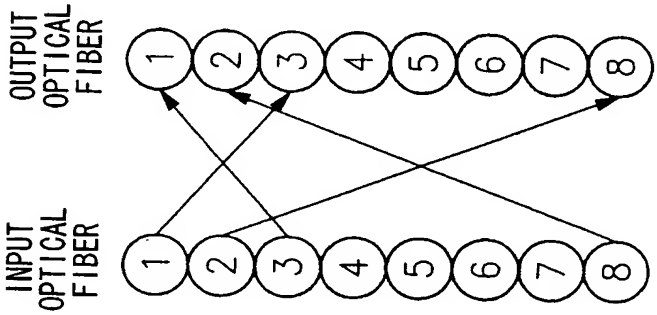


FIG. 32C

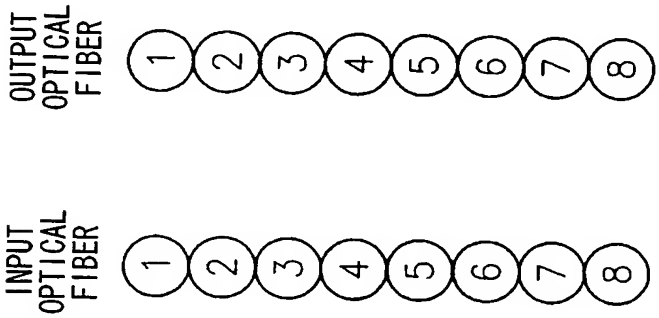


FIG. 32D